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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,576	03/12/2004	Tsann-Long Su	08919-118001 / 12A-921219	6494
26161 7590 12/26/2008 FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER DESAI, RITA J	
			ART UNIT 1625	PAPER NUMBER
			NOTIFICATION DATE 12/26/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/799,576	<b>Applicant(s)</b> SU ET AL.	
	<b>Examiner</b> Rita J. Desai	<b>Art Unit</b> 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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### DETAILED ACTION

Claims 1-53 are pending

Response to arguments.

Regarding 35 USC 112 2<sup>nd</sup> And 1<sup>st</sup> para.

Applicants argue that the term “DNA minor groove binder “ and one skill in the art would know which group would be encompassed.

Names, structures, and chemical formulas precisely define organic molecules. Attempting to define structure by function is not proper when the structures can be clearly expressed in terms that are more precise. It is not sufficient to define a chemical structure solely by its principal biological property. Applicants are attempting to define the structure of a claimed molecule by a single property. The U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences held in *Ex parte Pulvari* 157 USPQ 169 that “a material defined, as here, solely in terms of what it can do, of a property thereof or of the scientific principle that underlies that property ... does [not] particularly point out, as required by 35 U.S.C. 112, appellant's disclosed invention”.

The examiner is not saying that it is indefinite because of the breadth alone. The way it is claimed is in a functional language, as in the specifications it is defined by what it can be and not with what it is. See pages 10, line 21, lines 25-31, also pages 11 and 12 . Scheme 6 describes how to make one type of compound and that too at one positions.

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In view of applicants arguments of the specific position of the hydroxyl group . It cannot be seen how such a large group “ defined “ by a functional language is enabled.

The rejection still stands.

The rejection of the claims s 1-3, 6, 7,8,9,10,11,13,16-19, 22-26, 29,30, 39-43, ,46-49, 51 under 35 USC 102 over Elslager et al has been withdrawn as applicants have amended the claims to delete the hydroxyl group.

The rejection of the claims 1-3, 6, 7, 8, 9, 10, 11,13,16-19, 22-26, 29,30, 39-43, 46-49, 51, 52 and 53 over Joseph Leiter 1960 has been with drawn as the structure given by the examiner was wrong.

New Rejection

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

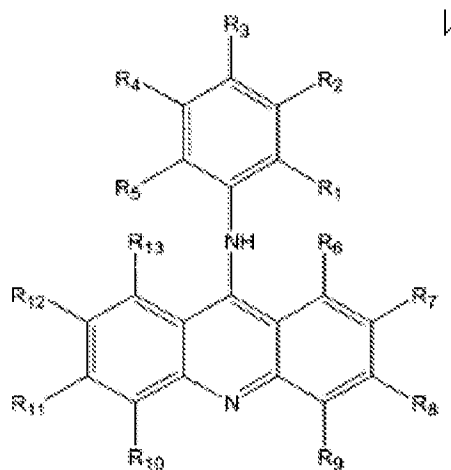
Claims 1-3, 6, 7, 8, 9, 10, 11,13,16-19, 22-26, 29,30, 39-43, 46-49, 51, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2883382 Elslager et al.

And also further in view of Gourdie et al and The chemistry of Antitumour agents

Derry Wilman

Applicants claims are drawn to compounds of the formula

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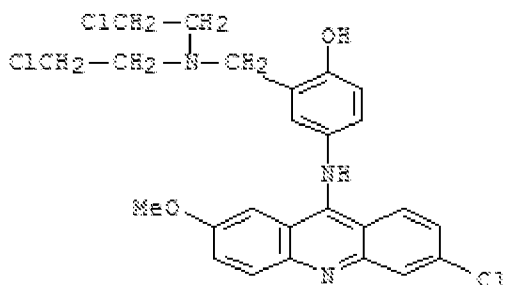
Wherein atleast one of the R's is a L-N(CH<sub>2</sub>CH<sub>2</sub>CL)<sub>2</sub> and others are

each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, and R<sub>13</sub> is, independently, hydrogen, halo, nitro, hydroxyl, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> hydroxyalkyl, CONHR<sup>a</sup>, NR<sup>b</sup>R<sup>c</sup>, CONH(CH<sub>2</sub>)<sub>m</sub>NR<sup>b</sup>R<sup>c</sup>, L-N(CH<sub>2</sub>CH<sub>2</sub>Cl)<sub>2</sub>, or a DNA minor groove binder;

And R superscript a, b, c are still further substituted.

*Scope & Content of Prior Art MPEP 2141.01*

The prior art by US 2883382 Elslager et al discloses the compound .



The substituents are the same as those of the invention. Except that applicants have amended the claims such that their R's are not a hydroxyl group, but can be an alkoxy or an C<sub>1</sub>-C<sub>6</sub> hydroxyalkyl.

Trudi Gourdia et al teaches similar compounds with the the acidines substituted with the aniline mustard group. These are also DNA-targeted anilines. See whole document , table 1 compounds B, example 15.

Derry Wilman teaches several acridine core compounds as antitumor agents.

Table 1.3 Physicochemical properties of 9-aminosacridines (35) and (50).

Name	Amsacrine (35)	CI-921 (50)
Alternative names	<i>m</i> -AMSA, Amisidyl, NSC 169992	Amsakog, NSC 143499
UV spectrum		
$\lambda_{\text{max}}$ (nm)	435	448
$\log R$	4.11	4.11
pK <sub>a</sub>		
Acridine N	8.02	6.95
Oxidation potential ( $E_{1/2}$ ) (mV)	280	240
DNA association constant (0.01 M) ( $M^{-1}$ )	$1.8 \times 10^4$	$2.1 \times 10^6$
DNA helix unwinding angle	20.5°	18°

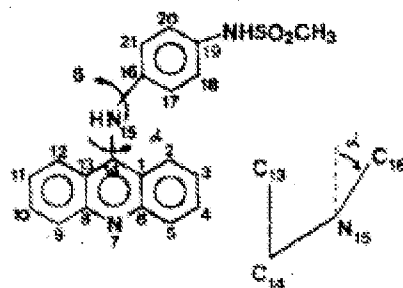


Figure 1.1 Conformation of amsacrine (35).

and

Amsacrine binds to DNA by reversible intercalation of the acridine chromophore<sup>54</sup>, with an association constant of  $1.8 \times 10^4 M^{-1}$  for calf thymus DNA in 0.01 M salt<sup>55</sup>. By analogy with the crystal structure determined for 9-aminosacridine binding to a dinucleotide<sup>56</sup>, amsacrine is postulated<sup>1</sup> to bind with the anilino ring lodged in the minor groove, with the 1'-substituent pointing tangentially away from the helix, in a position to interact with a second macromolecule such as a regulatory protein. This suggestion<sup>1</sup> seems very reasonable in the light of subsequent work on the mode of action of amsacrine (see later). However, it was suggested in a recent study of the rates of dissociation of amsacrine and anilino-substituted analogues from DNA that the anilino ring might bind in the major groove<sup>57</sup>.

#### *Difference between Prior Art and the claims MPEP 2141.02*

The applicants invention claims these substitutions can be anywhere for R1-R13.

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Also in the Gourdia reference the linker to the aniline mustard is a alkyl chain, whereas in the application the N is directly linked to the phenyl.

Wilman teaches the acridine core to have DNA binding properties and also some binding in the major groove.

Prima Facie Obviousness, Rational and Motivation MPEP 2142-2413

Gourdia teaches similar acridines but with a longer chain. Elsalager discloses a compound which is directly linked, thus motivating a person of skill in the art to make more compounds with the aniline mustard substitution at different positions.

Making them positional isomers and positional isomers are considered prima facie obvious in the absence of unexpected results. According to KSR v Teleflex one of skill in the art would have found it obvious and be motivated to make positional isomers with a reasonable expectation of success that it would retain its pharmaceutical properties.

Also an alkoxy is a H v methyl in a hydroxy group.

Thus in view of the teaching of the prior art one of skill in the art would expect that acridine substituted by  $L-N(CH_2CH_2CL)_2$  at any position would also have the DNA binding property and have some expectation of success at making new but similar compounds.

### ***Conclusion***

None of the claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rita J. Desai whose telephone number is 571-272-0684. The examiner can normally be reached on Monday - Friday, flex time..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres can be reached on 571-272-0867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

R.D.  
December 19, 2008

/Rita J. Desai/  
Primary Examiner, Art Unit 1625